Remarks

Claims 1-38 were originally filed and are pending.

Rejection Under 35 U.S.C. Section 102

Claims 1-38 were rejected under Section 102(e) as being anticipated by U.S. Patent Application Publication No. 2004/ 0068023 (Leatherdale et al.). This rejection is respectfully traversed for the following reasons.

Applicants describe and claim a process comprising

(a) providing a substantially inorganic photoreactive composition;

(b) exposing, using a multibeam interference technique involving at least three beams, at least a portion of said photoreactive composition to radiation of appropriate wavelength, spatial distribution, and intensity to produce a two-dimensional or three-dimensional periodic pattern of reacted and non-reacted portions of said photoreactive composition; and

(c) removing said reacted portion or said non-reacted portion of said photoreactive composition to form interstitial void space. (See Claim 1 (emphasis added).)

The process can be used to provide high refractive index contrast periodic dielectric structures.

As explained, for example, at pages 41- 46 of Applicants' specification, the process involves the exposure of the substantially inorganic photoreactive composition using multibeam interference (MBI) techniques involving at least three beams (preferably, at least four beams). (See, for example, Figure 1b of Applicants' specification.) Such MBI techniques generally involve irradiating a sample of the composition with electromagnetic radiation such that interference between radiation propagating in different directions within the sample gives rise to a two-dimensional or three-dimensional periodic variation of the intensity of irradiation within the sample, which produces a corresponding periodic pattern of reacted and non-reacted portions of the photoreactive composition.

The sample of photoreactive composition can be irradiated with at least three coherent or partially-coherent sources of electromagnetic radiation. Preferably, the periodic pattern within the sample is formed by directing electromagnetic radiation from at least four coherent or partially-coherent sources at the sample so as to intersect and interfere within the sample. Reaction of the composition can occur through either multi-photon absorption or one-photon

absorption (see, for example, page 11, lines 20-21, of Applicants' specification), but multiple, interfering beams of light are always utilized.

In contrast, Leatherdale et al. describe a method for making an organic-inorganic composite that includes irradiating a multi-photon reactive composition with sufficient light to at least partially react the composition and removing a soluble portion of the multi-photon reactive composition from the resulting composite. The multi-photon reactive composition includes: (a) at least one reactive species; (b) a multi-photon photoinitiator system; and (c) a plurality of substantially inorganic particles, wherein the particles have an average particle size of less than about 10 microns in diameter. The Examiner has asserted that Leatherdale et al. describe a method that anticipates Applicants' claimed process, but the Examiner appears to be confusing the multi-photon process of Leatherdale et al. with a multi-beam process.

Leatherdale et al. do not describe the use of multiple beam interference (MBI) techniques. Applicants refer the Examiner, for example, to Paragraph **[0021]** of Leatherdale et al., which describes the use of "a light source **12**" and states that "[t]he light **26** originating from the light source **12** is then focused to a point P within the volume of the reactive composition **24** to control the three-dimensional spatial distribution of light intensity within the composition to at least partially react the composition **24**."

Paragraph **[0022]** of Leatherdale et al. further states that "[g]enerally, light from a pulsed laser can be passed through a focusing optical train to focus the beam within the volume of the reactive composition **24**. Using the stage **16**, or by moving the light source **12** (for example, moving a laser beam using galvo-mirrors), the focal point P can be scanned or translated in a three-dimensional pattern that corresponds to a desired shape. The reacted or partially reacted portion of the reactive composition **24** then creates a three-dimensional structure of a desired shape."

Similarly, the working examples of Leatherdale et al. (for example, Examples 3 and 5) describe the use of a single, pumped Ti:sapphire laser and the movement of a coated substrate under "the focused beam." The Examiner's own remarks include reference to Leatherdale et al. "exposing the photoreactive composition by using an exposure beam" (emphasis added). Thus, it is clear that Leatherdale et al. do not describe the use of multiple, interfering beams of light.

Rather, Leatherdale et al. describe a conventional multi-photon photoreaction process in which a single beam of radiation is utilized and multiple photons from the single beam are

absorbed. (See, for example, Paragraph **[0002]** of Leatherdale et al., which explains that "[m]ulti-photon processes involve the simultaneous absorption of two or more photons by an absorbing chromophore.") Since Leatherdale et al. neither teach nor suggest the use of multiple beam interference (MBI) techniques, Applicants respectfully submit that their claimed invention is indeed patentable over Leatherdale et al. and respectfully request that the rejection under Section 102 be withdrawn.

Concluding Remarks

Reconsideration and allowance of Applicants' claims are respectfully requested.

Respectfully submitted,

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